

DRAFT REPORT ON 2005 ANADROMOUS STRIPED BASS FECUNDITY

California Department of Fish and Game's Central Valley Bay Delta Branch Sport Fish Unit performed a reconnaissance-level examination of adult striped bass fecundity in May 2005. We planned to compare our findings with those reported by Urquhart and Knudsen (1988) for the years 1979, 1980, 1984, 1985, and 1986, so adopted what we could of the sampling scheme and most of the methods they used (Whipple et al. 1984). The following is a brief description of our work and findings.

We planned to collect similar numbers of fish from both fyke traps deployed on the Sacramento River near Knights Landing and from gill nets deployed at the Sacramento River-San Joaquin River confluence, but logistical and environmental conditions prevented that. Instead, we collected 27 fish during four days from the fyke traps and 3 fish from the gill nets.

We placed the first females encountered during each survey day in a cooler. At the end of the day, we brought the collected fish to the Stockton DFG Office for further same-day processing. At the Stockton Office, we assigned each fish a unique identification number. For each fish we then (1) recorded fork length to the nearest cm, (2) made a brief examination of pyloric fat and general condition, (3) placed each ovary in a plastic bag labeled with the unique number and the side (left or right), and (4) collected several scales. After data collection, we discarded each carcass and put ovaries in a horizontal food freezer.

With regard to pyloric fat and general condition, each fish was in outwardly-excellent condition. Only one fish had even a trace of pyloric fat (as expected for fish making a spawning migration) and only one fish had noticeable parasites. Although we could not refer to a 'Munsell Book of Color' as used in prior work (Whipple et al. 1984), we noted that eggs in each ovary were approximately the same green hue. Green eggs are considered to be in better condition than yellow eggs (SWRCB 1983).

After we collected all the samples, we assigned ages to each fish by interpreting growth increments from collected scales and calculated total fecundity for each fish by multiplying the average number of eggs/gram of 2-3 subsamples from each left ovary by the total mass of both ovaries.

While the methods we used to calculate fish-specific fecundity allowed direct comparison with prior data, we explored a couple of potential biases and sources of error with the method. The next two paragraphs address these topics.

The expansion to total fecundity from average eggs/gram of 2-3 subsamples was always substantial and varied in proportion to total ovary mass. The average subsample weighed 0.274 grams (range 0.110-0.471) and the average mass of both ovaries was 496.1 grams (range 1690 g – 87g). Thus, accuracy of the fecundity estimates is biased low with increased ovary mass and (thus usually) with fish size. To reduce this bias and to the

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extant practicable, future subsampling of ovaries should be done in direct proportion to ovary mass.

To get a sense of whether or not it is reasonable (or necessary) to subsample from the anterior, middle and posterior portions of each ovary, we plotted egg density from paired anterior and middle subsamples (Figure 1). If the densities were equal, the points would fall on a line with slope of one. They more-or-less do, so it is reasonable but probably not necessary to subsample from three sections of each ovary.

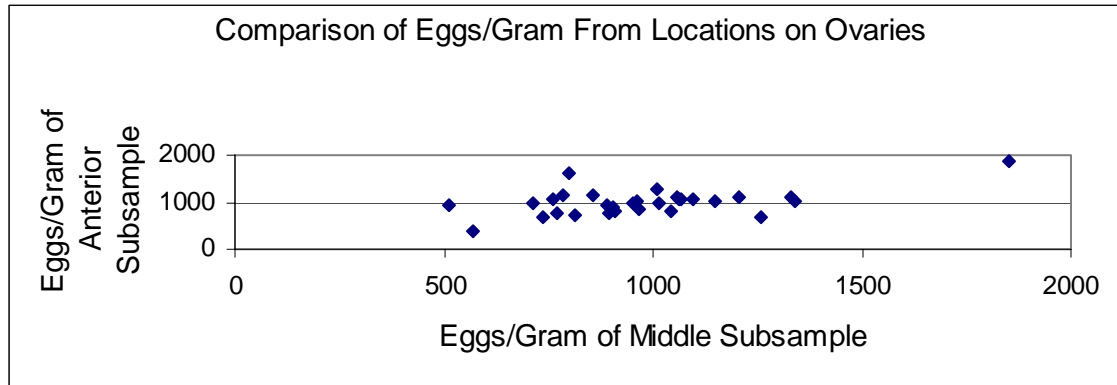


Figure 1

Given the preceding look at biases and sources of error, we have additional insight into the cost and validity of the following fecundity information.

We plotted paired right-left percent ovary mass by age (Figure 2) to describe ovary symmetry. If the mass of ovaries was equal, the percent would be 100. Instead, we found that left ovaries were usually somewhat more massive.

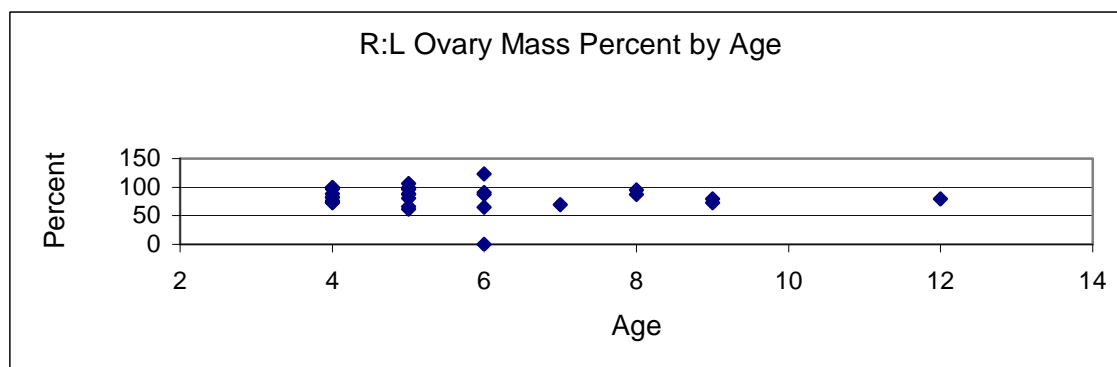


Figure 2

The slope of fecundity versus length in 2005 varied in a curvilinear fashion, where larger fish produce disproportionately more eggs than smaller fish (Figure 3). Fecundity in 2005 varied among (and within) age classes such that older fish were substantially more fecund (Figure 4). There is only a slight hint from this data that eggs from larger fish are

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usually larger than eggs from smaller fish (Figure 5); note that the near-vertical line section is between two of the three fish captured in gill nets.

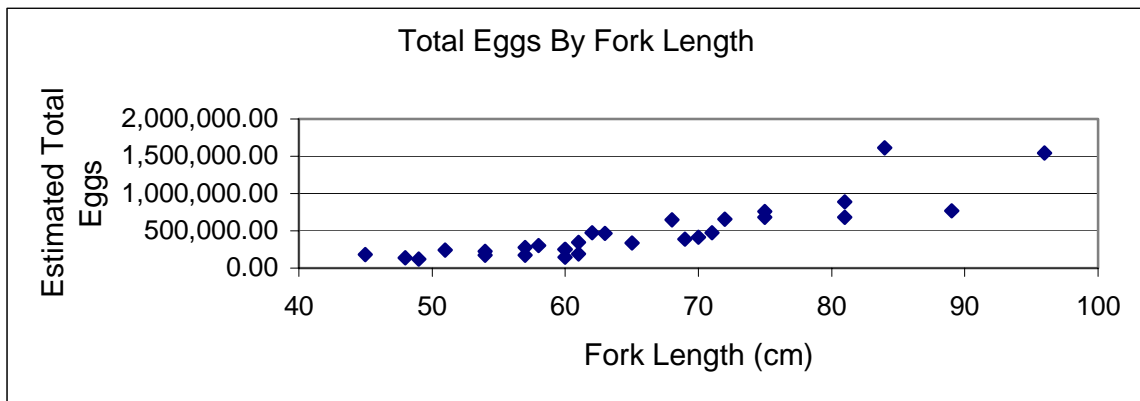


Figure 3

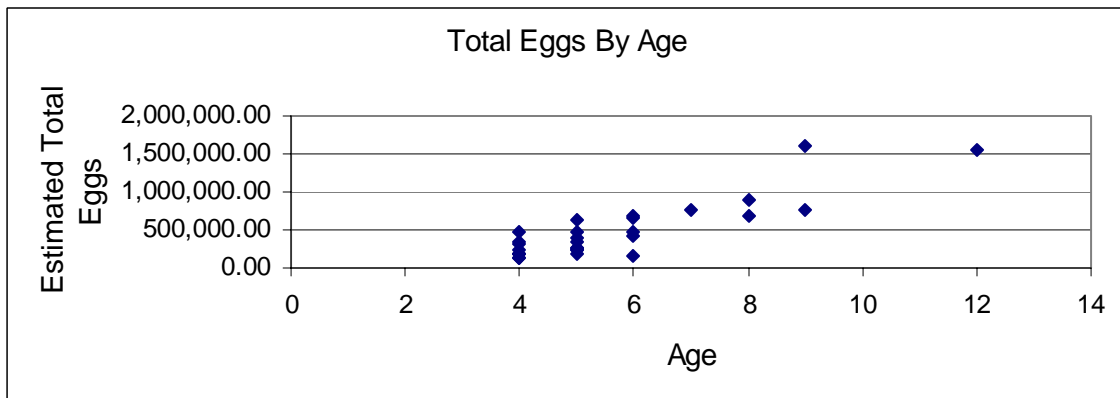


Figure 4

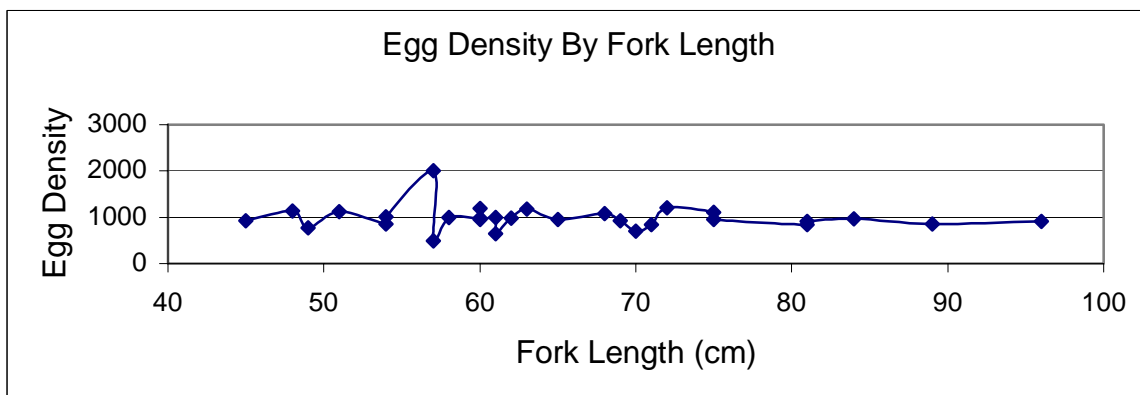


Figure 5

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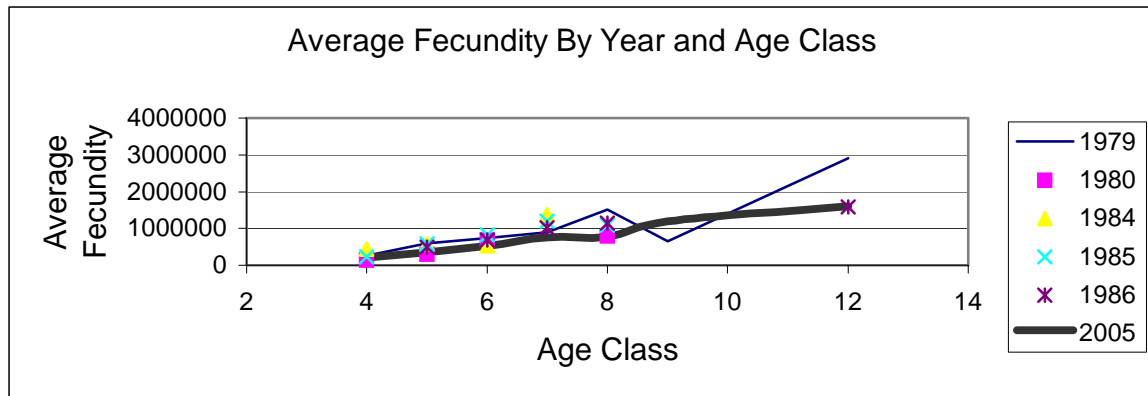


Figure 6

We examined just three potential San Joaquin-run fish, so can not compare 2005 San Joaquin-run age-specific fecundity with prior data. Because the three potential San Joaquin-run fish were not substantial outliers, we include them in the following comparison to prior data on Sacramento-run fish.

Fecundity in 2005 for fish captured in (largely) the Sacramento River was very similar to age-specific fecundity in the Sacramento River during the years 1979, 1980, 1984, 1985, and 1986 (Urquhart and Knudsen, 1988; Figure 6). Given that standard deviations for age-specific annual fecundity were always large and the fundamental characteristics of the data (e.g., sparse, somewhat biased, and performed by different workers in different millennia), this result suggests there have been no meaningful differences in fecundity during the survey years.

Literature Cited

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